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## NOTES ON SKELETAL REMAINS FROM MARTHA'S VINEYARD

By E. A. HOOTON

THE skeletal material forming the subject of this report comprises the remains of three individuals, two old men and a boy. The men were muscular individuals, with long heads and well-developed brow ridges. The cranial type is one frequently met with in New England Indians, especially in the Maine shell heaps. The boy was very large for his age. His skull is broader than any other New England Indian cranium in the Peabody Museum collection. The cranial index is 81.5, but with the development of brow ridges and strengthening of the muscular attachments of the occiput, at maturity, he would probably have had a somewhat lower index. He represents simply an individual variation of the type.

### SKELETON No. I (59488)

*Cranium.* This is the skull (pls. III and IV) of an aged male. It exhibits no deformation, and has been preserved entire.

The frontal region is broad and moderately retreating. There is a slight median eminence. The sagittal region is rather elevated and the sagittal suture lies in a slight furrow. The parietal bosses are well developed. About 3 cm. below bregma and 1 cm. behind the coronal suture on the left parietal is an old lesion of small size. The temporal region is rather compressed and the wings of the sphenoid are deeply furrowed. The occipital region is flat at lambda and below moderately convex with well-developed muscular attachments. The mastoids are large.

The serration of the sutures is simple. The coronal is completely obliterated in the pterion regions, and here and there along its entire length. In the sagittal and lambdoid sutures obliteration



FRONT AND BACK VIEW OF SKULL NO. 59488



SIDE AND TOP VIEW OF SKULL NO. 59488

has begun. The pterions are in broad H, and there is a large epipteric bone on the right side.

The supra-orbital ridges are well developed medially, and laterally the superior orbital margins are considerably thickened. The nasal depression is slight; the bridge of the nose high and broad. The ends of the nasal bones (nasalia) are depressed and irregular. The nasal aperture is narrow, with a well-developed spine and dull lower borders. The orbits are low and broad, with thickened margins, and there are traces of the infra-orbital suture. The sub-orbital fossae are but slightly marked. The malars are large, and the right side has a very large processus marginalis.

Most of the teeth in the maxilla were lost in life, and the alveolar arcade had undergone considerable absorption. In the mandible the right median incisor and canine remain, and are much worn. The palate was probably broad U-shaped.

The base of the skull shows deep glenoid fossae with a slight post glenoid process. The styloids have been broken away but were evidently small. The depression of the petrous portions of the temporal bone is slight. The foramen magnum is large and asymmetrical, with the edges much thickened. The condyles show arthritic flattening.

The mandible is large, but had undergone a good deal of senile reduction. The ascending rami are broad and the sigmoid notch is deep. There is a well-developed median chin. The condyles are flattened.

*Long Bones, etc.* These include the bones of the upper extremity, cervical and dorsal vertebrae, and foot bones.

*Humeri.* These are large and muscular bones. Just below the head of the right humerus there has been a necrosis involving the anterior and medial side of the diaphysis and the medullary cavity. The cancellous tissue has been destroyed and the whole presents the appearance of an infection due to a tumor.

*Scapulae.* Fragmentary. Large and muscular with high acromion processes.

*Vertebrae.* These present extensive marginal exostoses due to arthritis.

*Foot Bones.* Bones of the right foot only. The astragalus is high, and there are extensive supplementary articular facets on the medial side of the neck, showing that the man was in the habit of squatting. Viewed from above the external malleolar facet shows unusually great obliquity. The calcaneum is high with a well-developed sustentaculum.

*Estimated Height.* On the basis of Pearson's formula (h), the height of this man, based on the length of the left humerus and radius, was about 162 cm. Probably, however, if the bones of the lower extremity could be taken into consideration, the estimated stature would be considerably augmented.

#### SKELETON No. 2 (59489)

*Cranium.* The remains of the cranium include the frontal bone, the temporal bones, the face and the mandible.

The frontal region is broad and moderately retreating. The sutures of the cranial vault were probably largely obliterated. The temporal bones are massive and the mastoids large. There are three large retro-mastoid foramina and two small ones on the right side, on the left side there are two large foramina.

Medially the supra-orbital ridges are enormously developed. The lateral parts of the brow ridges are also large, and are separated from the median eminence by deep grooves terminating in the supra-orbital notches. The nasal depression was slight. The nasal bones are missing. The bridge of the nose was of moderate height and width. The nasal aperture is of medium width with a well-developed spine and dull lower borders. The orbits are of medium height. The malars are large and the zygomae thick and heavy. The sub-orbital fossae are of average depth. In the maxilla most of the teeth were lost during life, and the alveolar arcade largely absorbed. The only tooth remaining in the maxilla is the left posterior premolar which is much worn. The palate was U-shaped. Dental abscesses have affected the alveolar border in the region of the right canine and the left third molar. In the mandible the incisors, canines, premolars, and right third molars are *in situ*. All these teeth are much worn down; the right pre-

molars exhibit caries, and inflammations have affected the arcade about the roots of the first and second right molars.

The glenoid fossae are deep and there is a well-developed post-glenoid process. The *Tuber Culum articulare* is unusually large. The styloids which are broken away, were very large. A fragment of the occipital bone, including the basilar process and the left side of the foramen magnum, shows that there was no post-condyloid foramen on the left side. The occipital condyle is arthritically flattened.

The mandible is very large with a well-developed median mental process, broad rami, and a deep sigmoid notch. The condyles are somewhat flattened and slope from without downward and inward.

*Humeri.* These are large with very well-developed muscular attachments. The inferior articular surfaces show arthritic osteophytes.

*Radii and Ulnae.* The bones of the forearm give evidence of a great muscular development.

*Vertebrae.* Most of the vertebrae have marginal exostoses.

*Pelvis.* The pelvis is distinctly male. The sacro-sciatic notch is narrow; the prae-auricular sulcus is slightly developed. The sacrum is long, narrow, and straight.

*Femora.* The femora are large and muscular with well-developed pilasters. On each there is a pronounced crista hypotrochanterica, and platymeria is very marked. The head and neck in both instances show a most unusual torsion, which amounts to  $47^{\circ}$  in the right femur and  $48^{\circ}$  in the left. The lower two thirds of the diaphysis of the left femur shows a pathological deposition of bony tissue.<sup>1</sup> The condyles of both femurs are flat, and the shafts present a greater degree of curvature than is usual.

*Tibiae.* These are very platycnemic and have extensive supernumerary articular facets on the anterior lip of the lower articular surface.

*Foot Bones.* The bones of the feet are large. The calcaneum has an excessively developed sustentaculum tali; the astragalus has "squatting facets" on the neck.

<sup>1</sup> Dr. Arthur Keith is inclined to diagnose this condition as syphilitic.

## CRANIAL MEASUREMENTS

| Sex                             | No. 59488 ♂      | No. 59489 ♂      | No. 59490 ♂ |
|---------------------------------|------------------|------------------|-------------|
| Approximate age.....            | Past middle life | Past middle life | 12-14 yrs.  |
| Deformation.....                | None             | None             | None        |
| Glabello-Occipital length.....  | 187              | —                | 179         |
| Maximum width.....              | 137              | —                | 146         |
| Basion-Bregma height.....       | 141              | —                | —           |
| Auricular height.....           | 121              | —                | 112         |
| Minimum frontal diameter.....   | 99               | 99               | —           |
| Diameter bi-zygomatic.....      | (c.) 138         | —                | —           |
| Min. breadth ascending ramus..  | 39               | 42               | 32          |
| Bigonial diameter.....          | (c.) 96          | (c.) 100         | 100         |
| Mean angle ascending rami.....  | 117°             | 118°             | 127°        |
| Height of symphysis.....        | (c.) 38          | (c.) 35          | 30          |
| Bi-condylar width.....          | (c.) 134         | —                | (c.) 122    |
| Condylar-symphysial length..... | 109              | (c.) 120         | 106         |
| Orbits (right)                  |                  |                  |             |
| height.....                     | 32               | —                | —           |
| breadth.....                    | 43               | —                | —           |
| Nasal Aperture                  |                  |                  |             |
| height.....                     | 50               | —                | —           |
| breadth.....                    | 23               | —                | 21.5        |
| Basion-Nasion.....              | 110              | —                | —           |
| Palate                          |                  |                  |             |
| external length.....            | —                | —                | 53          |
| external breadth.....           | —                | —                | 68          |
| Maximum circumference           |                  |                  |             |
| (above brow ridges).....        | 521              | —                | —           |
| Arc                             |                  |                  |             |
| Nasion-Opisthion.....           | 383              | —                | (c.) 373    |
| vertical transverse.....        | 318              | —                | —           |
| Indices                         |                  |                  |             |
| cranial.....                    | 73.2             | —                | 81.5        |
| height-length.....              | 75.4             | —                | —           |
| height-breadth.....             | 102.9            | —                | —           |
| mean orbital.....               | 76.3             | —                | —           |
| nasal.....                      | 46               | —                | —           |
| external palatal.....           | —                | —                | 128.3       |
| cranial capacity.....           | 1,480 c.c.       | —                | —           |

*Estimated Height.* On the basis of Pearson's formula (f), the height of this man was about 175 cm.

## SKELETON No. 3 (59490)

*Cranium.* The cranial vault is incomplete and somewhat warped; the skull base is missing; the facial skeleton is fragmentary but the palate with the teeth *in situ*, and the mandible, are preserved (pl. v). The subject was a boy thirteen or fourteen years old at the time of his death. The second molars had just erupted and the epiphyses of the long bones are separate from the shafts.

The frontal region of the skull is broad and bulging. The bosses





SIDE AND TOP VIEW OF SKULL NO. 59490

are prominent. The sagittal region is slightly elevated, very broad, and with the parietal tuberosities well marked. The temporal region is full. The occipital region is moderately convex, and the muscular attachments are, as yet, little developed. The serration of the sutures is very simple and they are all open. There are no Wormian bones. The pterions are in broad H; there are neither parietal foramina nor retro-mastoid foramina; the mastoids are little developed.

The supra-orbital ridges are undeveloped, but the glabella is prominent. The nasal depression is very slight and the bridge of the nose seems to have been rather broad and low. The nasal aperture was broad with a well-developed spine and dull lower borders.

|  | No. 59488 |     | No. 59489 |       | No. 59490             |        |
|--|-----------|-----|-----------|-------|-----------------------|--------|
|  | R.        | L.  | R.        | L.    | R.                    | L.     |
| FEMUR                                  |           |     |           |       |                       |        |
| Length, bi-condylar . . . . .          | —         | —   | 482       | 494   | 415<br>(without head) | 412    |
| Length, maximum . . . . .              | —         | —   | 489       | 499   | 421                   | 420    |
| Diameter of head, maximum . . . . .    | —         | —   | 50        | 50    | —                     | —      |
| Sub-trochanteric diam.,                |           |     |           |       |                       |        |
| antero-posterior . . . . .             | —         | —   | 27        | 25    | 23                    | 22     |
| lateral . . . . .                      | —         | —   | 38        | 40    | 30                    | 31     |
| Middle shaft diam.,                    |           |     |           |       |                       |        |
| antero-posterior . . . . .             | —         | —   | 32        | —     | 28                    | 28     |
| lateral . . . . .                      | —         | —   | 27        | —     | 24                    | 24     |
| Angle of torsion . . . . .             | —         | —   | 47°       | 48°   | 45°                   | 32°    |
| TIBIA                                  |           |     |           |       |                       |        |
| Length maximum (minus spine) . . . . . | —         | —   | 391       | —     | 349                   | —      |
| Middle diameter,                       |           |     |           |       |                       |        |
| antero-posterior . . . . .             | —         | —   | 37        | 37    | 29                    | 30     |
| lateral . . . . .                      | —         | —   | 22        | 23    | 22                    | 21     |
| Nutritive foramen diam.,               |           |     |           |       |                       |        |
| antero-posterior . . . . .             | —         | —   | 44        | 40    | 34                    | 33     |
| lateral . . . . .                      | —         | —   | 26        | 24    | 23                    | 23     |
| FIBULA                                 |           |     |           |       |                       |        |
| Length maximum . . . . .               | —         | —   | —         | 376   | —                     | —      |
| HUMERUS                                |           |     |           |       |                       |        |
| Length maximum . . . . .               | 323       | 322 | —         | 341   | —                     | —      |
| Max. diam. articular head . . . . .    | 45        | 46  | —         | 47    | —                     | —      |
| RADIUS                                 |           |     |           |       |                       |        |
| Length maximum . . . . .               | 256       | 254 | 262       | 266   | —                     | —      |
| ULNA                                   |           |     |           |       |                       |        |
| Length maximum . . . . .               | 279       | —   | —         | 286   | —                     | —      |
| INDICES                                |           |     |           |       |                       |        |
| Femur                                  |           |     |           |       |                       |        |
| Middle index . . . . .                 | —         | —   | 118, 5    | —     | 116, 6                | 116, 6 |
| Index of platymeria . . . . .          | —         | —   | 71, 0     | 62, 5 | 76, 6                 | 70, 9  |
| Tibia                                  |           |     |           |       |                       |        |
| Middle . . . . .                       | —         | —   | 59, 4     | 62, 1 | 75, 8                 | 70, 0  |
| Index of platycnemia . . . . .         | —         | —   | 59, 0     | 60, 0 | 67, 6                 | 69, 7  |

The mandible is infantile, but large. The third molars had not yet erupted, but the median incisors and first molars show some wear. The wear on the median incisors slants from behind downward and forward, showing that the bite was not "edge to edge." The quality of the teeth is excellent. There are four cusps on the upper molars and five on the lower. The incisors and canines show the typical shovel form which Dr. Aleš Hrdlička has demonstrated to be a characteristic of the American race. There is a slight crowding of the lower incisors. The palate is parabolic in form and of medium height.

The glenoid fossae are deep and there is a small dehiscence in the floor of the auditory meatus on each side.

*Other Skeletal Parts.* These are all of good size with the muscular attachments as yet little developed. The femora show a developing pilaster, incipient platymeria and flattened condyles. The torsion of the head and neck, as in the preceding subject, is great. It amounts to  $45^{\circ}$  in the right femur and  $32^{\circ}$  in the left. The occurrence of such an unusual amount of torsion of the femoral head and neck in both of these skeletons, would indicate that this character is possibly something more than an individual variation. Pronounced positive torsion of the femoral neck and head is often observed in the American Indians, but such extreme torsion is unusual. Examination of a number of femora belonging to New England Indians does not seem to show that this character is any more pronounced in remains from this region than in those coming from other parts of the country. No entirely satisfactory theory explaining the causes of femoral torsion has been advanced.

*Estimated Height.* On the basis of Pearson's formula  $c$ , the height of this boy, based on the length of the right tibia, including both epiphyses, was about 162 cm. This would make him very large for his age. According to Boas the average stature of 15 year old boys of the larger North American Indian stocks is 158, 0 cm. and of white boys (Worcester) 162, 0 cm. On the evidence of the teeth and long bones this boy was in all probability younger than 15 years.

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